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ABSTRACT

Instructional design is the art and science of crafting effective learning environments. The main challenges in instructional design are about content or process. Content should be considered first. A key challenge is ensuring that authors write in a way that is engaging and actively involves learners. Technology is another important challenge, especially in distance education (DE). Developers must overcome their tendency to bring traditional teaching models to meet the challenge of rapidly changing technology. The way forward in online DE is for developers to use their local expertise to develop online resources and concentrate on integrating available resources and creating the context and environment that allows students to access the best materials available. Practitioners just beginning the process of instructional design for self-learning in DE need to consider the following components of a typical plan: the introduction; role of staff; student characteristics; subject description; aims and objectives; content outline; learning environment; interaction and activities; assessment; learning materials; student requirements; learner support; development schedule; and evaluation. (Twenty-eight print references and online resources are listed.) (MN)

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Instructional Design for Self-Learning in Distance Education

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Course design and development is a people-oriented activity that calls for creativity and innovation.

I perceive instructional design as the art and science of crafting effective learning environments. That is, it calls for the application of scientific and artistic skills in the creation of effective learning conditions.

AN INTRODUCTION

Having been asked to write about how to design and develop distance education courses, I have to start by stating "it all depends". Though it sounds like a bit of a cop out, it's true. Context is paramount. Having worked in different countries and for various organisations as both a writer and an instructional designer, mostly as the latter, I know that every job has unique challenges and variables. Course design and development is a people-oriented activity that calls for creativity and innovation; it cannot be fully captured by a neat prescriptive model, just as there can never be a single model of human learning.

Before getting into detail, I'd better clarify that I perceive instructional design as the art and science of crafting effective learning environments. That is, it calls for the application of scientific and artistic skills in the creation of effective learning conditions.

THE MAIN CHALLENGES

Although each development project has a life and a culture of its own, in most cases there are recurring themes and patterns. One way to tease them out is to address the issue from the long-used divide of *content* and *process*. My contention is that process is more likely to cause difficulty for development teams. And here I'm assuming that most distance education development takes place in a team environment, even though many still have only one author.

Consider content first. As an author is chosen because of their content expertise in a discipline area, there is an immediate general agreement on what is to be learned in the course. Those commissioning the development will usually have interviewed or at least considered a range of potential writers. They will have made a decision on who might best fulfil the task, with the criterion of content expertise at the top of their list. In many situations, authors are given a good measure of autonomy in determining the content of the learning material.

Of course there are exceptions to this neat arrangement, and these often arise with a team of authors. There have been course teams where I've sat through many hours of meetings as a group of writers thrash out their differences, debating the relative merits of topic areas and their relative importance to potential students. But these are necessary and often positive experiences; they can produce higher quality materials than those produced by individuals, or by a mindless acceptance of standard curricula.

As mentioned, it is the area of process that produces the most angst. By process I mean the multitude of issues that arise in distance education, including the course development process, how the course will be taught, what kinds of assessment will be used and the ever-present bugbear of schedules and timelines. For first-time authors the process of course development is a confronting experience, often radically different from their usual teaching practice. A few thrive but many struggle. This has been well documented; *A Case for Coarser Courses* is a title that springs to mind, in which an author railed against an interminable development procedure.

This was, and perhaps continues to be, the fundamental dilemma for organisations developing distance education courses – finding the balance between creative measures and the demands of systems that seek conformity to a standard, efficient method. There was significant improvement in the overall quality of learning materials, but often the most radical innovation in course development was the use of wide margins, icons or a second colour in the standard ring binder folder.

This is not to say that the graphic design of self-learning materials is unimportant. It is so important that although instructional designers may have ideas about what constitutes good graphic design, a competent and creative graphic designer should be part of the development team. What do good self-learning materials look like? There is no substitute for examining real examples. If these are not readily accessible, one way to get some is to check the ICDL database (see Online resources) and locate materials in an area of interest. Most distance education institutions are willing to send sample copies. The Commonwealth of Learning resource collection (see Online resources) is another source.

A key challenge is ensuring that authors write in a way that is engaging and which actively involves the learners. New authors have a natural tendency to write for their peers, especially if they are academics who are used to writing for academic publication. They need to be convinced that their materials should read more like a tutorial than a lecture, with an emphasis on interaction. One way to do this is to get them to develop the learning activities (Lockwood, 1992) for the students first, and then write or locate the content to complete the tasks. They can even be required to complete formal assessment items like exams, assignments or project requirements before building the learning materials to support them.

TECHNOLOGY: ANOTHER CHALLENGE

Technology has thrown something of a spanner in the works, both for distance educators and those in more traditional teaching environments. Online learning has witnessed the same kind of mindless muddling found with earlier technological movements.

Developers tend to bring traditional teaching models to meet the challenge of rapidly changing technology; the majority of online course developers have followed like lemmings, with screen after screen of content notes which students end up printing out to read later. Even the available proprietary software has tended to reflect a conservative model of teaching and learning: "here's some content, learn it and have it tested by this assessment mechanism." They are often more about the management of learning than about the learning process itself.

Interestingly, it is probably distance educators who have ended up using online technology the most appropriately. Rather than rushing to put everything online, they've kept the printing presses rolling and have used the Internet for what it's good for: communication through e-mail, discussion groups, assignment submission and feedback. This has helped overcome slow communication, one of the fundamental weaknesses of earlier models of distance education. But they need to look further and go further. Having sped up communication, they need to harness the opportunity for students to engage in collaborative learning through more innovative virtual tutorial arrangements.

What pressures has this meant for distance educators? I remember being at a conference where a delegate gave a paper on the "bionic academic", reflecting the multitude of factors pressing on our erstwhile instructional designers. That was long before the advent of the Internet, which has thrown us into the most challenging arena yet.

I've been recently involved in developing a course that aims to exemplify all that is good about flexible learning (the emerging middle ground between distance education and on-campus education, or just another passing bandwagon?), and I must admit it's been the most professionally pleasing experience I've had in years. It brought back to me the notion of "getting the mixture right" (Daniel and Marquis, 1979), and of how various technologies compare in their ability to support interaction or independence. Print-based materials, CD-ROMs and audio tapes readily support independent learning, while traditional classrooms, the Internet and the telephone provide fruitful environments for interactive learning (interactive here meaning communication among learners and between learners and educators). Yet the various media are still too often used inappropriately.

One thing I found, in developing a subject with a major online component, was that it took less work than a traditional print-based course. This was partly because the development team was more interested in the process than in the content. The focus was on the activities and on the interaction between participants that would help build a learning community. Content thus didn't loom as large as usual, and we were able to rely on printed readings and on links to relevant online resources.

The message is, if you're going to acquaint students with topics like action research and phenomenography, don't write about them yourself; point the students to available web sites (for phenomenography, visit www.ped.gu.se/biom/phgraph/welcome.html). The main task was to create a coherent learning environment, a "look" and "feel" that united the online and print-based materials. This notion is well explored in Boshier et al. (1997), where the authors provide examples of courses that creatively use existing learning resources. A geology course that bases activities around current online government seismic data is a striking instance.

This hints at what I believe is the way forward in online distance education. We should be using our local expertise to develop online resources, rather than subjects, so that we can stop reinventing content that is probably better done elsewhere. Our job is to integrate available resources and create the context and environment that allows our students to access the best material available. It will be a sorry day if more and more institutions begin to protect their resources from others.

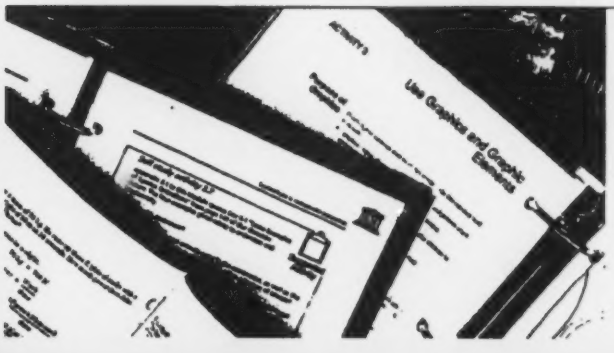
OTHER CHALLENGES

I earlier mentioned the issue of deadlines and schedules. It is very rare indeed that this part of the process doesn't become problematic, and rather paradoxically, this is true whatever the length of the schedule. A two-year project can get into as much trouble with timing as one scheduled for six months. Somehow there is always a mad flurry of activity as the final deadlines draw near, even when all seems to be going swimmingly. Instructional designers, or whoever is managing the project, learn to engage in the subterfuge of setting false deadlines. Not revealing to the author/s what the real deadlines are builds in an allowance for slippage.

Teamwork is an area that requires delicate handling, as power relationships can begin to emerge. If clumsily handled this can lead at best to hurt feelings, and at worst, a failed project. There has been more than one occasion where protagonists have been kept apart and teamwork abandoned when members adopt intractable positions, and require considerable cajoling and soothing to stay on track. As there have been other times where a team of potentially divisive personalities has stuck to it, engaging in long, contentious meetings well into the evening until a truce is finally declared and brandy is shared.

starting BUT HOW DO I GET STARTED?

All instructional designers agree on the need for effective planning of the design and development process. The success of this process largely depends on the preparation of a document, often called a plan or a blueprint, with essential elements such as clear indications of what will be done, who will do it and by when. These are added to the general description, which has the usual study elements of content, assessment and time schedules. The following outline provides brief descriptions of the parts of a typical plan. Note that for the plan to be of most use, it should be treated as a working document that is regularly updated as changes occur in the development and production phases.



INTRODUCTION

This should provide a brief overview of what is in the plan, along with any necessary background information.

THE STAFF

This section should list those involved and answer the following key questions:

- Who will be developing and teaching the course?
- What support staff will be involved?

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- What will the respective roles of the team members be?
- Who will be the project's coordinator?

THE STUDENTS

This question needs to be carefully considered and should address the following:

- Who will be studying the course?
- What are their expected backgrounds and learning needs?
- What learning experiences will they bring to their study?
- What support and preparation in adapting to flexible learning will they require?

SUBJECT DESCRIPTION

This section should first outline any necessary institutional requirements, like the subject title, points value, level and prerequisites. The subject's relation to the rest of the course should be explained. Subject content and the approach should be briefly outlined. This information will often be readily available in existing course approval documents.

AIMS AND OBJECTIVES

The aims are the overall goals for student learning. The objectives are more specific, setting out what learners should be able to do, understand and value after completing their study. Well-designed objectives can provide a basis for later construction of assessment items. This section can also include an outline of ways in which individual aims and objectives, set by the learners themselves, will be met. Note that the term "learning outcomes" will sometimes be used rather than "objectives". Though there are differences (Kandlbinder, 1997), they are often used interchangeably.

CONTENT OUTLINE

This shows what the students are expected to learn in order to meet the aims and objectives. The content outline can be a list of specific main topics and sub-topics, which for a modularised course can be presented under the module headings. It can also be a diagram illustrating the relationship between major concepts.

THE LEARNING ENVIRONMENT

This vital component determines what teaching and learning methods will be employed for students to achieve the objectives. The learning environment determines how the students are going to learn the content. By addressing this challenge, development teams can move well beyond simply presenting content and devising tests to check students' understanding. Consideration can be given to the overall approach, focusing on the learning activities or the process rather than the content. Examples of ways the learning environment can be constructed include problem-based learning, case study approaches, clinical teaching, experiential learning, videoconferencing and computer-based learning.

A useful device in designing the learning environment is to construct an organisational outline that shows the essential components of the subject, along with how they fit together. As well as describing the learning resources (online elements, multi media resources, print-based materials or lectures), it should clearly indicate the relationship between the key components. This can be done as a table, which lists the learning resources and shows the amount of time that learners are expected to spend with each resource during their study. Its value lies in its ability to show the expected total study time of the learners, and to identify areas where learning demands might exceed available time.

The structure of the table will depend on the components of the learning environment. TABLE 1 shows the anticipated study hours for a subject that has a base of printed study materials, along with online learning materials and a discussion group for interaction. Note that the students' independent study time should also be taken into consideration.

TABLE 1: EXAMPLE OF OUTLINE WITH ANTICIPATED STUDY HOURS

Module	Topic	Printed materials	Activities	Disc. Group	Assignment	Ind. study	Total Time
1	Intro. to Vetanics	2	3	3	2	2	12
2	Subosthany	2	2	3	3	2	12

INTERACTION AND ACTIVITIES

This section indicates how students will interact with academic staff and with each other, and describes the learning activities. For example, the kind of expected interaction during tutorials will be explained along with whether the students are to use the online facility for information or communication purposes, searching for web resources, or working with multi media learning material. Any proposed use of group-based learning should also be included.

ASSESSMENT

This provides an indication of the overall assessment structure, including the balance between assessment items and a description of the nature of the items (examinations, essays, reports, investigations or problems). The mode of submission of assessment items, whether electronic or hard copy, will be detailed. Time lines and policy on late submission can be included. Note that clear indication must be given as to how the assessment meets the objectives.

LEARNING MATERIALS

This section should identify all materials students need to complete the course, such as texts, readings, audio visual and multi media elements, and should include which of them the learners will need to purchase.

STUDENT REQUIREMENTS

It is important to clearly indicate anything particular that students might need to study effectively, such as Internet access. Listing special requirements is especially important for technology-supported learning.

LEARNER SUPPORT

Learner support elements such as tutorials, library, information technology, administration, learner-teacher contact or learner-learner contact, should be clearly outlined.

DEVELOPMENT SCHEDULE

The schedule is usually a table which lists the major components of the course, indicating when and by whom the components will be developed. For large and complex development projects, the use of project management software can prove very beneficial.

TABLE 2: SAMPLE DEVELOPMENT SCHEDULE

DEVELOPMENT TASK	COMPLETE BY
Module 1 Notes & web materials	15/6 (M. Crossen / A. Pringle)
Module 1 Activities and assessment	25/6 (J. Grogan)
Module 2 Notes, web materials, assessment	15/7 (M. Crossen / A. Pringle)
Module 2 Lab guide	25/7 (J. Grogan)

EVALUATION

Overall evaluation strategies should include the formative evaluation that will take place during the development phase. This can be peer evaluation, trials or other approaches designed to ensure that potential problems are addressed well before the course is offered. Plans for summative evaluation, which will take place as the first students experience the learning environment, should also be outlined. Such evaluation, which normally includes both teachers and learners, is through interviews, focus group discussions and questionnaires.

THE REST IS EASY!

Good planning is essential to the design and development of effective learning materials. While it may be going a bit far to claim the rest is easy, good planning certainly makes life much easier than trying to address issues as they arise. The essence of the design is in the vision that is found in the planning document. This document sets the way for all subsequent development, though details may change as the project advances.

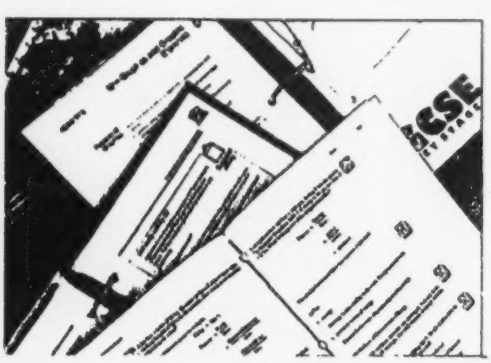
The work for some instructional designers may finish once the planning stage is completed, but it is usual for them to be involved right through the development and production of the course. That is why instructional designers require project management skills; these are not just organisational skills, but the ability to keep a team on track and to help members work through individual difficulties and conflict within the group. Finally, evaluation provides the feedback necessary for improvement.

conclusion

IN CONCLUSION

So where does all this lead us? The great thing about this kind of work is that it's fundamentally about people. This is why no neat prescriptive system can ever hope to cope with all the complexities of course development in distance education. Far more important than the system is the quality of the people; persons of talent and commitment can overcome the deficiencies of a system, but no system can cover up the deficiencies of uninterested and uncommitted people.

NOTE: This article has drawn from Murphy (2000), and also includes a modified version of the Flexible Learning Development Plan found in Murphy et al. (1999).



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RECOMMENDED FURTHER READING

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Driscoll, M. (1998) *Web-based training: Using technology to design adult learning experiences*. San Francisco, Jossey-Bass.

Hartley, J. (1994) *Designing instructional text*, 3rd edition. London, Kogan Page.

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Race, Phil. (1994) *Preparing materials for open, distance and flexible learning: an action guide for teachers and trainers*. London, Kogan Page.

Commonwealth of Learning, The (1999) *Learner Support in Open and Distance Learning*

One of a series of Training Toolkits designed to assist trainers in preparing and offering workshops on topics in distance education. Contact COL for more information.

ONLINE RESOURCES

GENERAL RESOURCES AND LINKS

www-icdl.open.ac.uk: The International Centre for Distance Learning (ICDL), an international centre for research, teaching, consultancy, information and publishing activities based at the Open University in the UK.

www.vlib.org/~colin/Distance.html: The World Wide Web Virtual Library's list of resources on distance education.

www.gsu.edu/~wwwitr/docs/distance.html: Lists of links on distance education.

calvin.ps.cc.athabascau.ca/distance/resources.htm: Resources in distance education from Athabasca University.

www.distance-educator.com/portal/designers.html: The designers' section of a US-based web site dedicated to distance education.

www.usq.edu.au: The University of Southern Queensland has a number of online courses, and its demonstration courses is closely related to many of the issues in this article. Click on the "Demo Subject" button and follow the instructions. The procedure is slightly tedious, but it's worth the effort!

www.bookstand.com/style/top100d.htm: This site provides the top ten books on instructional design, as chosen by a number of leaders in the field such as Bela Banathy and Michael Hannafin. Those who know his work will be surprised by some of the books on David Merrill's list!

www.col.org/cfor: The Commonwealth of Learning Information Resource Centre at the COL web site.

ONLINE ARTICLES AND JOURNALS

www.fdavis.com/resources/cms_comp.html: "Comparative Feature Analysis of Leading Course Management Software", an article for those contemplating using existing software as a platform for an online distance education course.

www.ncsa.gov.edu/~dbarnes/EDDist_homepage.html: "Instructional Design Methodologies and Techniques" from The George Washington University in Washington, D.C.

www.ed.uiuc.edu/courses/edpsy387/design.html: "The Web: Design for Active Learning" from the University of Illinois.

www.irrodl.org: Online journal, *International Review of Research in Open and Distance Learning*, from Athabasca University.

www.cde.ualberta.ca/CDEmpl/3-01.html: The other side: an article on the institutional experiment by a group of distance learners

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